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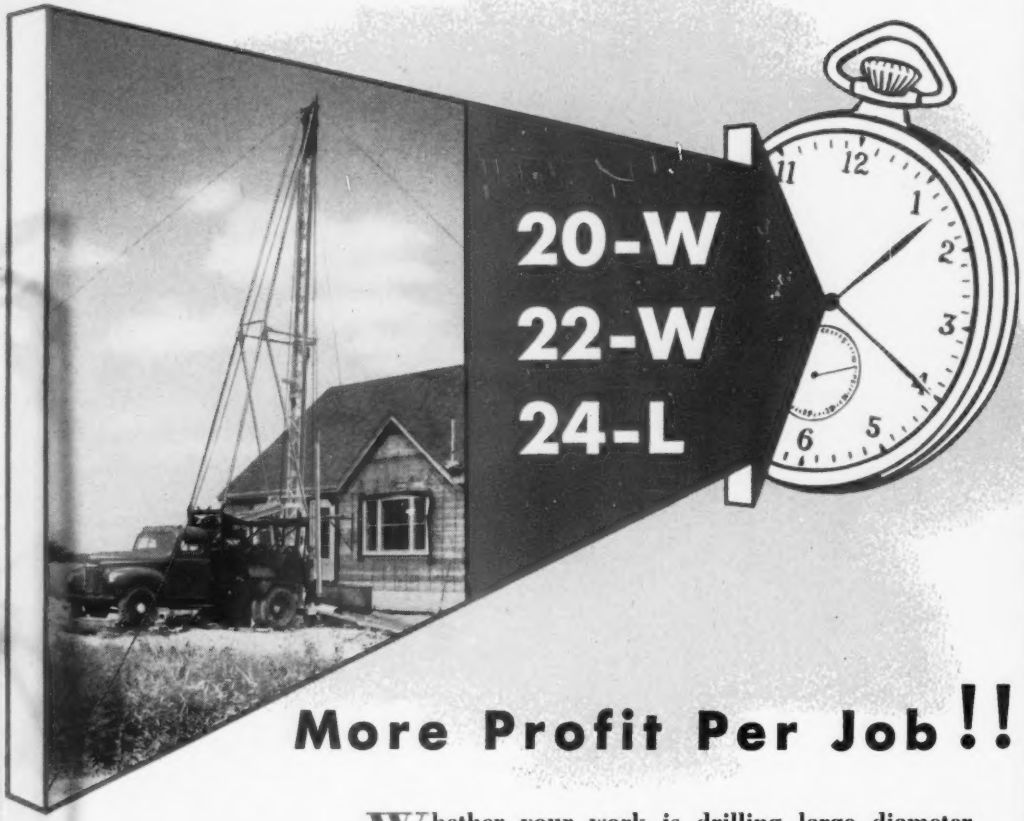

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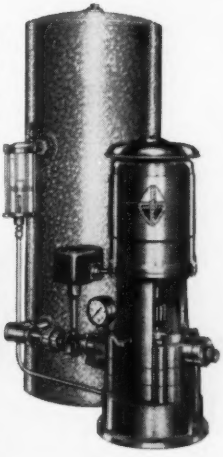

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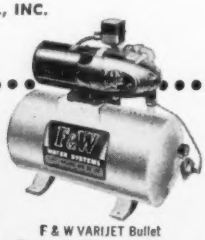

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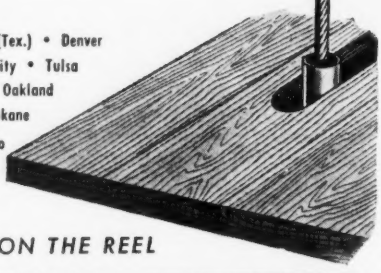

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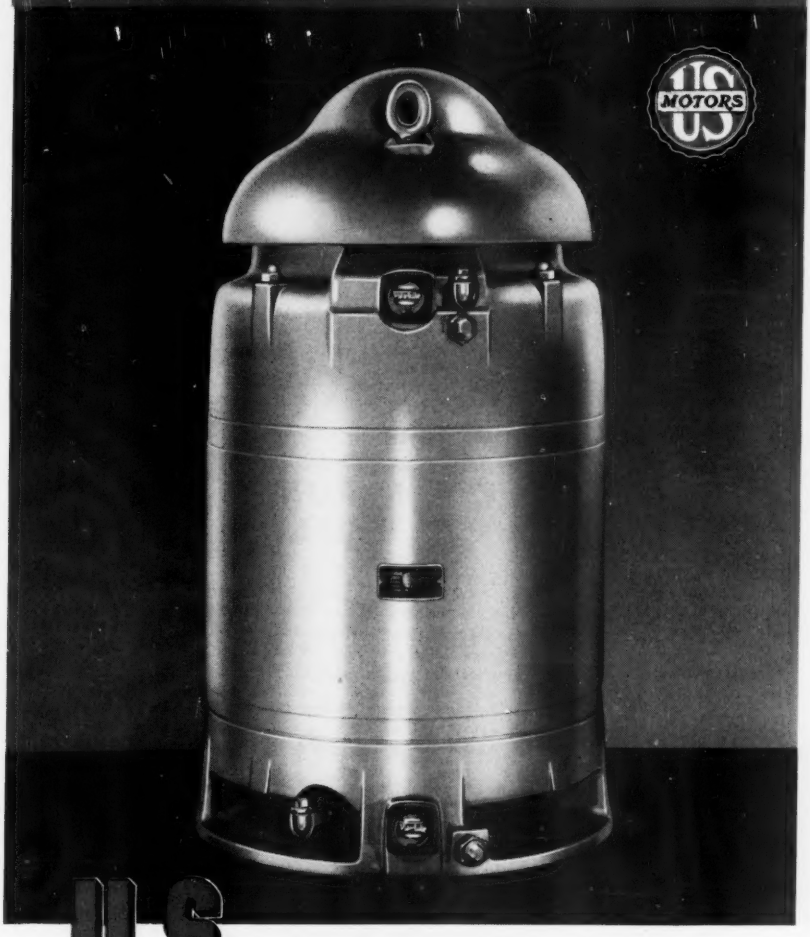

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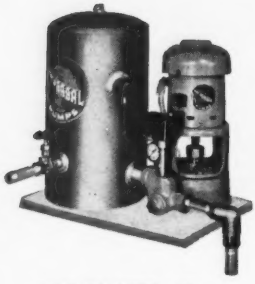

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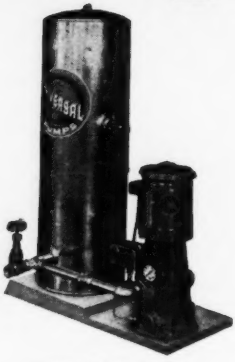

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THE MONTHLY MAGAZINE
FOR WATER WELL DRILLERS
Founded 1927

Vol. 26 No. 6

June, 1952

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On Our Cover . . . Casimir Szydlowski, drilling contractor from Milwaukee, Wis., is putting down a six inch suburban home well near the south edge of the city. When the picture was taken he was at approximately 65 feet, expecting to go to about 180 feet. (Photo by Robert McCoy)

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California's Fresh Water Dike Experiment

By Ray Day

PART I: THE PROBLEM

West Coast hydraulic experts plan fresh-water wall along seacoast points to halt seepage of salt water under farmlands.

At Manhattan Beach, California, where the blue Pacific gently slaps at the side of white sand dunes, hydraulic engineers of the State Division of Water Resources and the Los Angeles County Flood Control District are fighting a spectacular underground battle with the mighty ocean. The experiment in which they are grimly engaged may mean the difference between life and death to inland underground water supply basins within the state.

California is losing its natural ground water supply because of actual or threatened seepage of salty ocean water into ground water basins along the coastal fringes of the state from Mexico to Oregon. Sea water has already invaded 13 major and minor basins, immediate danger exists in seven more, and potential danger exists certainly in 15 and probably 45 additional coastal basins about which little is now known.

What the engineers are now searching desperately to build is some kind of underground wall which will stop the seawater encroachment. As things now stand, it is believed that this underground wall can be built hydraulically with artificial injections of fresh water. There is a feeling of urgency about the project, and it is impossible to interview engineers, farmers, geologists or businessmen in the area without sensing the importance of the task. Everything has been considered; even the construction of subsurface asphalt dikes. When well water five miles inland comes out with a chloride content as high as 500 to 20,000 parts per million, people naturally get worried.

Area Badly Affected

The ground water basins especially affected at the present time include Mission Valley, the San Luis Rey Valley, Santa Margarita Valley, the Central Coastal Plain of Orange County, the West Coastal Plain of Los Angeles County, Malibu Creek Valley, Trancas Creek Valley, Morro Valley, Salinas Valley, Pajaro Valley, the coastal segment between Salinas and Pajaro Valleys, Santa Clara Valley, and the Sacramento-San Joaquin delta between Pittsburg and Antioch.

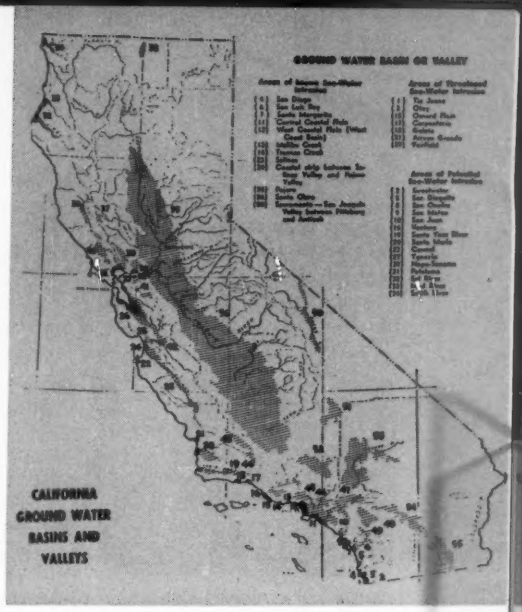
Water-bearing deposits in these ba-

sins may be in direct contact with the ocean or bay floor, or they may extend beneath the floor as a confined pressure aquifer and at some distance offshore be in contact with sea water. Because of excessive extractions of ground water by cities, towns, and individuals, the natural levels along the seaward margins of these basins have been drawn down below normal and the natural seaward hydraulic gradient reversed. The spectacle of excessive ground water pumping has resembled a host of people, each equipped with a straw, trying to drink simultaneously from the limited supply of a single glass of water. There was just so much, in other words, and they overdid it.

The California State Legislature during its 1951 session appropriated $750,000 to the State Water Resources Board for an experimental program to determine an economic engineering answer to the problem. As matters now stand, the Los Angeles County Flood Control District is performing the necessary field and investigational work under contract with the Division of Water Resources. The first experimental wells have been placed and others are being drilled on a force-account basis.

Many Solutions Studied

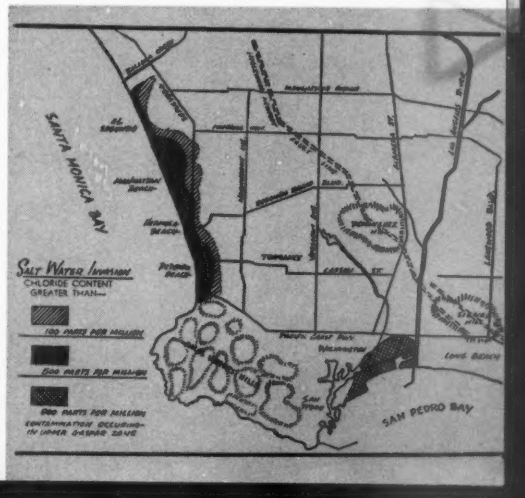
When engineers began to search for a solution to the problem, many possibilities suggested themselves. Engineers of the California Division of Water Resources had much experience to draw on, and the Los Angeles County Flood Control District has for many years studied the action of underground water in connection with water spreading basins in relation to its flood control program. Individual engineers of both agencies are world renowned, and so the problem from the outset was sure to be approached in the light of all contemporary knowledge.



From the start, the problem suggested the following angles of approach:

1. Ground water levels could be raised to or above sea level by the reduction or rearrangement of the pattern of pumping draft, or possibly by a combination of both reduction and rearrangement.

This method would require that adjustments would be made to the pumping draft so that ground water levels would rise to or above sea level and be maintained there except possibly for very short periods, and those infrequently. This method would positively establish and main-



tain the natural seaward hydraulic gradient.

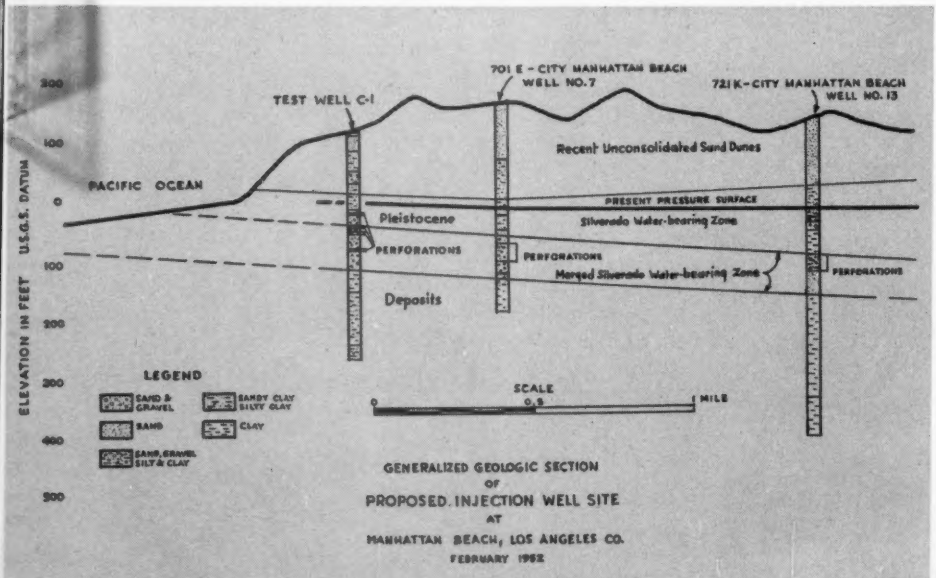
Insofar as is now known, this is the only method which would be effective in all cases. In some instances the method would have the disadvantage of failing to allow the full development and utilization of the available ground water storage capacity for water conservation. In some basins, raising the water table would decrease the inflow or supply to the basin while outflow or escape might be increased. A source of supplemental water supply of a quality suitable for direct use should be available for this method.

2. Overdrawn aquifers could be directly recharged to maintain ground levels at or above sea level. This method would require that ground water levels in the overdrawn aquifers be raised and maintained above sea level by artificial recharge through the application of supplemental water by surface spreading, injection wells, or a combination of both.

One advantage gained by this procedure is that in some instances reclaimed waste waters of suitable quality can be used. In other instances, water flows which might be greatest in times of least demand might be stored underground until the water was needed. The engineers were thinking in terms of effluent waste water from the Hyperion sewage treatment plant, and of excess winter floodwaters, in considering this alternative.

By maintaining ground water levels above sea level by this method of artificial recharging without changing the pumping draft, engineers believed that no determination of water rights or control of pumping would be necessary. But for many of the basins an expensive distribution and recharging system would be required. Operating expenses would probably be high. And while Flood Control District engineers knew plenty about recharging by surface spreading, comparatively little had been learned about continued recharging with injection wells, particularly with reclaimed waters.

3. Artificial subsurface barriers could be built, but it was believed that the costs would be relatively great. The possibility of a subsurface barrier of sheet piling, puddled clay, emulsified asphalt, cement grout, bentonite, silica gel, or calcium acrylate suggested themselves, and all



GENERALIZED GEOLOGIC SECTION
OF
PROPOSED INJECTION WELL SITE
AT
MANHATTAN BEACH, LOS ANGELES CO.
FEBRUARY 1952

were carefully examined, because engineers believed that a barrier of this type would be permanent.

One or more types of such subsurface barriers may yet prove to be the best solution to prevent seawater intrusion into many of the narrower coastal basins, especially in those where the principal aquifers occur at relatively shallow depths.

4. A pumping trough could be developed along the coast to purposely draw the ground water down and produce an artificial localized seaward hydraulic gradient. But it would add very little to the usable storage capacity of the basin, and the installation and operation would be costly. California is water conscious, and because this method would waste considerable fresh water, the engineers threw this one out as economically unfeasible.

5. A fresh water ridge could be maintained along the coast underground, by means of injection wells which would build up a continuous ridge above sea level.

This method would require the maintenance of a freshwater ridge in the principal water bearing deposits along the coast at all times. If this method is hydraulically feasible, and the engineers believe strongly that it is, such a ridge of fresh water just inland from the coast would be as effective in repelling the intrusion of sea water as would an oceanward slope extending entirely across the basin. There would, of course, be some waste of water to the ocean. However, a greater lowering of the water table landward from the ridge would then be permissible, and a greater development and utilization of available underground conservation storage could be realized. The cost of this method, it seemed, would be less than the direct recharge method. It may be necessary to rearrange the pumping pattern in the basins to get the maximum effectiveness with this method at the lowest cost.

Several of the planning engineers are already thinking in terms of using reclaimed waste waters of good quality. The use of such waters is the only solution which may be economically feasible in a number of the basins, because other sources of water are too expensive. Already Harold Hedger, Chief Engineer of the Los Angeles County Flood Control District, has pointed out the pos-

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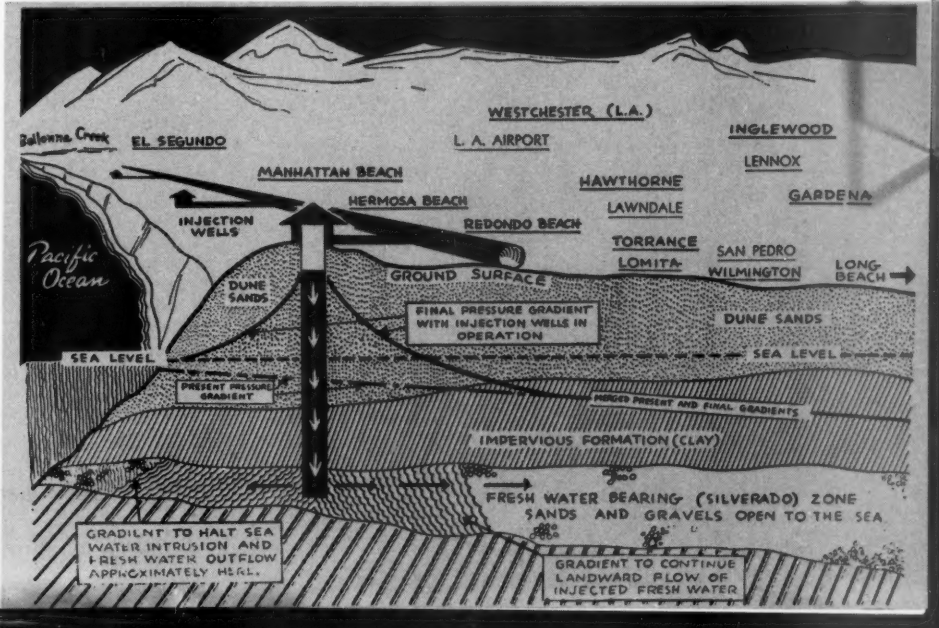

Water

By Joseph Lawren

This little island, a few miles off the west coast of Florida, near St. Petersburg, was without a steady supply of water until Thomas Redmond ferried his 21-W over to bring in 2,500 gph.

WHEN Pinellas County, Florida, acquired Mullet Key as a recreational area, it was faced with the problem of obtaining an ample water supply, not only for drinking purposes, but for fire protection. The island had previously used only shallow wells and rainwater for all purposes.

Drilling a well to get the needed water wasn't the only problem in this case, however. First a rig had to be transported to the island. The county park board appropriated funds of $1,200 and drilling contractor Thomas G. Redmond of St. Petersburg was commissioned to do the job.

The trailer mounted Bucyrus-Erie 21-W, truck and tools were loaded on a barge and towed from St.

Top photo: The 21-W trailer mounted rig and truck were loaded on a barge at St. Petersburg, Fla., and transported to Mullet Key. Here the barge is beached and unloading work is under way.

Left: After rig was on shore, casing and other equipment was unloaded by hand.

For Mullet Key

Petersburg to the island, a distance of approximately five miles. Upon reaching the island the barge was beached, planks were laid to shore and braced, and the rig was unloaded. From there it was a usual transport and setting-up job near the Mullet Key restaurant, before drilling started.

In the drilling process several shell and stone veins were passed, the early ones were thin and made up largely of Coquina and other shells, and water was first struck at about 65 feet. The first water reached, however, was a strong saline solution as was the next which was found at about 195 feet. Sound rock was struck at about 290 feet and after three weeks of drilling, with depth at 307 feet, clear water was reached.

The 4-in. well promised to supply 2,500 gph of water to the little island. The 65-ft. high supply tank that formerly held only rain water and water from shallow wells now has a steady flow of well water pumped into it. This well is expected to produce an ample amount of water for the area, both for drinking and for fire protection, for some time to come.

Rig is shown in position next to the water tower that previously held only rainwater and water from shallow wells. A new supply of 2,500 gph was brought in.

Driller, Thomas G. Redmond, left, and his assistant, Dwight Maddox are shown with the 21-W rig, and the flowing well they drilled for Mullet Key.

Step-Up Expected in Delinquent Tax Claims

by Harold J. Ashe

In this article about tax liens, the author suggests that recent tax scandals may prompt a tighter policy of collections. He also points out that collection efforts are the same for small and large claims.

ONE of the little noted consequences of the tax scandals in the Bureau of Internal Revenue is an apparently sharp stepping up in tax liens filed against delinquent taxpayers. At all costs, drillers should avoid such liens.

A check of one medium-size southwestern county indicated that in the past six months the Federal government has placed liens against property to protect $170,000 in past due taxes. While one or two of the liens involve large tax sums, the bulk of them probably average under $2,000 each, and some are for only a few hundred dollars. This is pointed out because a common misconception among taxpayers is the belief that the government will not seriously press small tax claims.

A typical case. The government placed a lien against a contractor and his wife for 1949 income taxes in the amount of $254.62. In addition, a lien was placed against his business in the amount of $855.74 for 1950 and 1951 employees' withholding and social security taxes.

Except in the case of famous or notorious name personalities, these

liens are rarely publicized. Therefore, businessmen are too prone to assume that leniency — rather than liens — may be expected from the government. Actually, the filing of liens is a daily occurrence by the Collector of Internal Revenue in every district in the nation.

Liens give the claimant authority to seize property in order to satisfy a debt. The government exercises this authority when necessary, to take property and sell it to satisfy the taxes and interest due. Liens are filed with the county clerk in the county in which the taxpayer is located or has his principal place of business. They may serve to cloud the title and prevent the disposal of property by the owners. Such tax liens, as with other liens, will automatically show up in the preparation of abstracts of title.

Liens may be made to secure either the individual taxpayer's own income taxes, or withholding taxes and social security taxes deducted from employees, as well as the employer's matching social security taxes.

The claims empower the government, as a last resort, to take over both personal and real property, including a business, although there are certain minimum exemptions. Usually seizure is resorted to only after the government is satisfied that evasion is involved or, at least, the taxpayer is indifferent to paying the claims against him.

Penalties for Evasion

Failure to pay one's acknowledged taxes is viewed somewhat differently from attempts at tax evasion, according to the Bureau of Internal Revenue. However, there is a fine line

(Continued on page 36)

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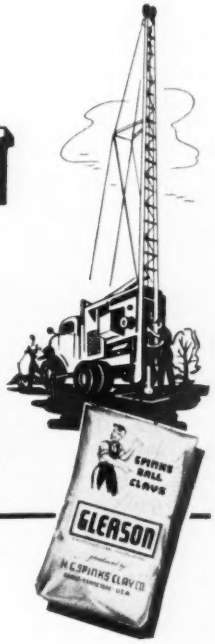

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NEWS of the month

U. S. Irrigation Expert To Help India Plan Wells for Famine Relief

David A. Stoner, Bureau of Reclamation Regional Chief of Irrigation Operations at Sacramento, Calif., has left for India to assist in an Indian government famine relief program for increased food production with irrigation water obtained from 2,000 new wells, according to the department of interior. He is expected to return to the United States shortly after June 1 with his report.

"There is acute necessity to increase food production in India, in order to alleviate a famine which now requires large portions of the national income to be diverted to relief," Reclamation Commissioner Michael W. Straus reported to the Secretary. "As a measure calculated to bring additional land most rapidly into production, the Indian government has proposed an extensive well-drilling program," he explained. "The wells are to be of large capacity with pumps driven by either diesel or electrical power. Some 2,000 wells, averaging 400 ft. deep, are contemplated."

Develop Water Softener Cleaning Compound

Water softeners are often expected not only to soften the water but also to filter out sediment, organic matter and other foreign material. As a result they become fouled, and the bed of zeolite or resinous mineral particles become coated so that their efficiency for softening water is reduced.

To keep the zeolite or mineral bed clean and efficient, Calgon, Inc., Pittsburgh, Pa., makers of Calgon and Micromet, have developed a special compound, known as Zeotone for toning up the zeolite mineral bed, according to the manufacturers.

When Zeotone is added along with the salt used in regenerating the softener, it loosens and disperses deposits of iron, organic matter, silt and other foreign material filtered out of the water and which tends to coat the zeolite particles.

Zeotone contains a special agent which acts to sterilize the mineral bed each time the compound passes through the softener; and also contains a corrosion inhibitor. Chemists of Calgon, Inc., report that Zeotone does not affect the taste, odor or quality of the softened water as the compound is washed out of the softener and down the drain when the softener is backwashed to flush out the loosened foreign matter.

Three States Announce Annual Convention Dates

Idaho

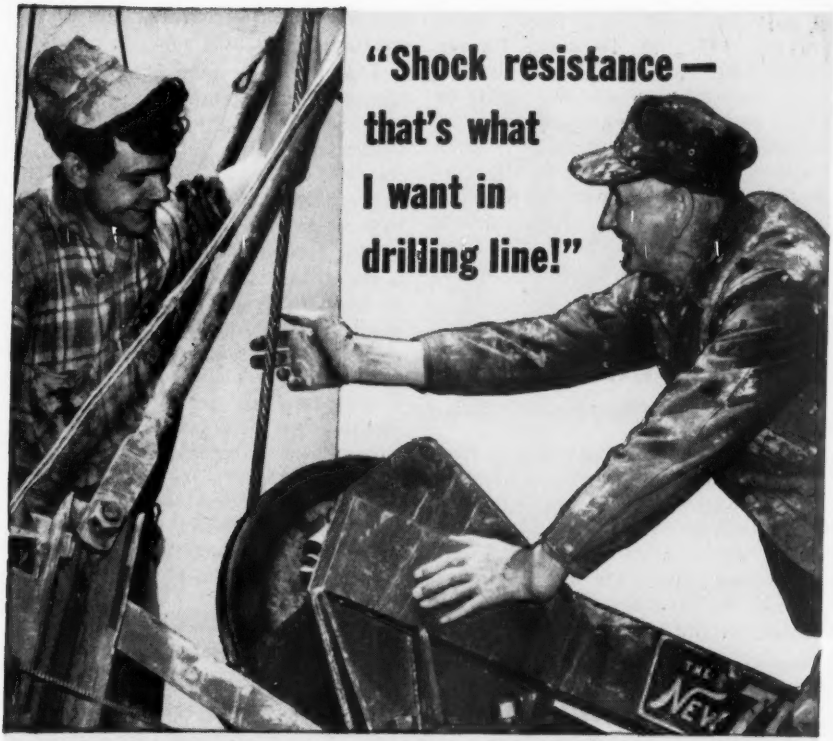
According to notice from association secretary N. B. Bowler, the Idaho Drillers' Assoc., Inc., is planning to hold its annual convention in Idaho Falls June 9 and 10.

Montana

August 4 and 5 are the days chosen by the Montana Water Well Drillers' Assoc. for their annual convention. The Florence Hotel, Missoula, Mont., will host the group, according to sec. treas. B. W. Whitmer. Association president Russell Mobray is in charge of arrangements.

Florida

There will be a meeting of the



● This drilling rig was pounding its way through solid rock when the photograph was taken. It was equipped with shock absorbers, but even so, the drilling line took a severe pounding.

The driller was using American Tiger Brand Mor-Spring Drilling Lines. He said, "We've got to have a line with plenty of shock resistance and this line has it. What's more it stands up under the abrasion of sharp rock and sand."

No matter what kind of job you have involving wire rope, you can find Tiger Brand in a size and type to fit your needs. Write for a copy of our Recommendation Book, "The Right Wire Rope for the Job."

U·S·S AMERICAN TIGER BRAND MOR-SPRING DRILLING LINES

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

Florida Well Drillers' Assoc. Sat., July 5, 1952, at 10 a.m., Lamar Hotel, Orlando, Fla. This is the annual meeting, for one day only, to elect and install new officers and directors and to transact any other business on hand. This is the corrected time and place of the meeting according to Earl Van Every, editor of the *Florida Driller*, who forewarded the announcement of the corrected dates.

Farmers Advised On Pump Needs

With the rapid expansion of Florida's rural electrification system, many farmers will now be interested in installing electric farm water systems.

Because an electric water system is one of the biggest savers of time and labor on the farm, it is one of the first major improvements that farmers should consider.

The financial condition of each farmer will determine the extent of his original installation, but a water system to meet all future needs should be planned from the start to prevent expensive corrective measures upon expansion.

The heart of a farm water system is the pump and this is the first item to be considered and purchased. A shallow well pump is sufficient where distance from pump to water level is not over 22 feet, but for deeper wells a reciprocating or a deep well jet pump must be used. Jet pumps are not recommended where the distance from pump to water level exceeds 75 feet. Regardless of which type is used, a screen filter at the foot of the line is necessary to prevent sand from entering and damaging the pump.

The size of the pump will be determined by the quantity of water needed on the farmstead. To estimate his water needs the farmer should consider that each member of his family will use 50 gal. daily, each milking cow 35, a beef cow or horse 12, a hog four and each 100 chickens four gal. The pump should be large enough to pump a day's water needs in two hours.

Tank Sizes Vary

To prevent excessive wear and tear on the pump the next item usually considered is a pressure tank. Tank capacity should be 42 or 80 gal., depending on size and water requirements of the farm.

After these major items in the electric water system have been installed the farmer can expand his system as needs arise and finances permit to provide running water to the kitchen, water troughs for livestock and poultry, indoor bathroom facilities for the health and sanitation of his

WELL DRILLERS!

If you operate in a "hard water" area, don't limit your services to supplying your customers with hard water—give them soft water as well. Rent them FILTER-SOFT units, the nationally accepted method of converting hard water into soft. Servicing FILTER-SOFT along with your well-drilling is a "natural."

Get a

Filter-Soft

Franchise

We furnish softener units and inexpensive regenerating equipment on sale or rental basis. No experience necessary.

Territory being allotted daily. Write for interesting details.

FILTER-SOFT CORP. Dept. TD
12911 Artesian Detroit 23, Mich.

family, and other outlets to make life easier and more efficient on the farm.

Each addition to the farm electric water system will pay in larger production and savings in time and labor.

By A. M. Pettis, Rural Electrification Specialist, Florida Agricultural Extension Service.

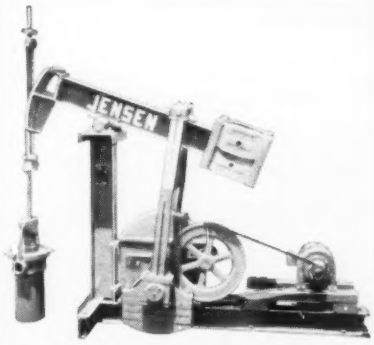
Plastex Firm Now Markets Plastic Pipe

A complete range of flexible and rigid plastic pipe for every piping need is being manufactured by The Plastex Pipe and Extrusion Co., Columbus, Ohio. The firm has been engaged in the custom extrusion of plastics since 1939 and will continue to carry on this business in addition to making plastic pipe, according to a company announcement.

The new product known as Plastex Corrosion Proof Pipe has many applications in mining operations, petroleum production, water wells, chemical processing, drainage and irrigation lines and general piping of pure or corrosive liquids and gases. The pipe comes in a complete range of standard pipe sizes from ½ to 6 inches. Coils are made up to 400 ft. long and straight lengths, 25 ft. long.

Red Jacket Buys Cook Water Systems Line

The Red Jacket Mfg. Co., Davenport, Iowa, has purchased the Cook line of domestic water systems and will continue their manufacture at the Davenport plant. Since the line will continue to be offered to Cook distributors, the sale and distribution of Red Jacket products is not affected. Acquisition of the water



Pump Handle Pete Says:

Remember this when you drill a well . . .

The water wells you drill are exactly as satisfactory as the pumping equipment installed. No more, no less.

For an abundant supply of cheap, dependable water from any good well 100 feet or deeper, drillers everywhere are recommending Jensen Water Well Pumping Units. Available in 12 sizes.

Over 30 years experience, and enthusiastic customers around the world. Write—or have your favorite supply store write to 1016 Fourteenth Street, Coffeyville, Kansas for specifications and prices.

JENSEN BROS. MFG. CO. INC.

Coffeyville, Kan., U.S.A.

systems line, Red Jacket announces, will permit more stable utilization of manufacturing facilities and thereby result in better service for all of Red Jacket's customers and dealers.

Cook Well Strainers Being Manufactured By New Company

Cook well strainers, formerly manufactured by A. D. Cook, Inc., are now being manufactured by the Cook Well Strainer Co., Lawrenceburg, Ind. Cook Well Strainer Co. is a new concern, organized to continue the manufacture and sale of the well known strainer line in sizes ranging from 2 to 40-in. According to principals of the new organization, a large stock of materials is being maintained to insure prompt shipment. A new catalog, also illustrating a number of new methods of installing screens, is now available. Copies may be obtained by writing to Cook Well Strainer Co., Lawrenceburg, Ind.

The new Bucyrus-Erie 22-W drill model, a ¼ size working rig, was the center of attraction at the Illinois Water Well Drillers Association Convention held Feb. 7-9. It was the first showing of the model which is an accurate scale model, powered by an electric motor. Other groups that have seen the model include the associations at Wisconsin, Missouri, Minnesota, and Indiana.

Byron Jackson Co. Now Manufacturing Cook Turbine Pumps

Byron Jackson Co., Los Angeles, has acquired facilities formerly occupied by A. D. Cook, Inc., in Lawrenceburg, Ind. Byron Jackson will continue the manufacture of the Cook turbine pump line at the Lawrenceburg plant. The Cook dealer organization will be maintained as a distributing outlet for these pumps. Byron Jackson will also use its newly-acquired Lawrenceburg facilities to increase production of its line of BJ centrifugal pumps and to satisfy the growing demand for its products in the eastern section of the country.

Dayton Announces Product-Policy Changes

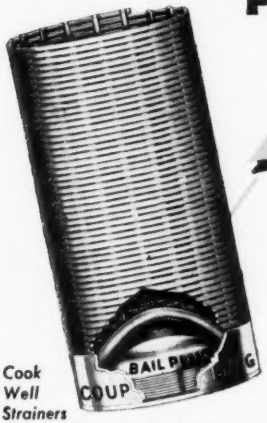
A new complete package water system has been announced by the Dayton Pump & Mfg. Co., Dayton, Ohio.

The new pump is designed principally for small homes, bungalows, cottages, and filling stations. This shallow well system has a reciprocating type pump with automatic pressure switch. The standard ¼ hp motor has a thermal overload protector

COOK

PAYS OFF IN

Millions



Cook Well Strainers provide the most direct passage from the sand stratum into the well. Available in as many different sized slots as required. Made of the finest materials: Red Brass, American Everdur Brass, Armco Iron or Stainless Steel.

Three million gallons of nature's own *pure* water every 24 hours! That's the kind of day-after-day results the O. H. Acom Rice Farm of Wardell, Missouri is getting through 40 feet of Cook Wire Wound Bronze Well Strainer. And this is just one of the many thousands of agricultural and industrial deep-well installations that depend on Cook "50-year tested" Well Strainers. Write today for complete details and specifications.

COOK WELL STRAINER CO.
LAWRENCEBURG INDIANA

"World's Leading Name in Well Strainers"

and the tank has a capacity of 12-gal.

The Wrentham Co., 12 Whiting St., New Haven, Conn., has been appointed New England sales representative to handle all Rapidayton electric water systems and water softeners.

Fred H. Blackwood has been appointed district sales representative in the Detroit area to cover southern Michigan and northern Ohio.

Peerless Introduces New Pump Line

By use of standard mechanical shaft seals, to replace conventional stuffing boxes, the pump shaft of the new Type AS pump is shortened to ½ the length of shafts in conventional pumps of the same size, the manufacturer reports. As a result, the shaft is rigid and shaft deflection is materially reduced. Seals used in this pump design are of standard manufacture and are available from standard sources of supply. The use of seals has eliminated stuffing box housings and requires less floor space.

The pumps horizontal, split-case design, makes removal of the top half of the pump case for inspection and maintenance of the rotating elements quick and simple. The entire rotating element can be lifted from the case for inspection, repair or replacement without disturbing pump alignment, or connections to the pump. The entire rotating element can then be disassembled with ordinary tools.

Additional features of construction of Type AS pumps are fully described and illustrated, together with pump cross-section, elevation and plan drawings and dimensional data, in a new bulletin. Additional information is available by writing the manufacturer, Peerless Pump Div., Food Machinery and Chemical Corp., 301 West Ave. 26, Los Angeles 31, Calif.

Announcement was also made by the company of the appointment of Roy F. Brisbois as Process Pump Specialist. Brisbois will devote his time to pump application problems in refineries, chemical process and industrial plants, co-ordinating his efforts with the Peerless' field engineers and distributors. He has been with the company five years in sales work, in the Pacific district.

Built to be *BETTER*

EVERITE Pumps

- *Quality* featured
- *Priced* competitive
- *Simplicity* in design

Write today for detailed information on this complete line of Water Systems that are *built to be better!*

THE EVERITE PUMP & MANUFACTURING COMPANY, INC.
617 N. Prince St. • Lancaster, Pa.

"Over a quarter of a century experience"

Report Given On Illinois Water Resources

An unusual and exhaustive statistical study of mortality experience with municipal water wells in Illinois, was made by the State Water Survey and reported in a Water Resources Division meeting at the an-

nual conference of the American Water Works Assoc., held at Miami April 29-May 6, 1951. This paper was prepared by H. E. Hudson, Jr., and J. L. Geils, respectively Head, and Associate Engineer, Engineering Subdivision, State Water Survey Department of Registration and Education, Urbana, Ill.

The Illinois State Water Survey has been collecting information on ground water developments since 1895 and was able to include 2,604 water wells constructed for municipal supply in Illinois as a basis for the report. During the seventy years ending in 1948, about 540 public ground water systems had been built and those used in 1948 were serving about 1,100,000 people.

From 1910 to 1945, fifty municipalities in Illinois abandoned ground water supplies for surface water. In 1945, 210 Illinois municipalities were using surface supplies, including those that had given up ground water.

List Wells by Degree of Usefulness

In the studies, the term "Retired Wells" included all wells in existing public ground water systems which had been permanently taken out of service by the operators or which were not equipped for service and no longer used as part of the supply system. Abandoned and standby wells were included under the title "Retired Wells." The abandoned wells were those that were taken out of service in communities that abandoned the use of ground water. Standby wells included little used wells that are still equipped with pumps and are in existing public ground water systems.

In a diagram entitled "Chronological Record of Wells in Public Ground Water Supply Systems," is shown, from 1875 to 1948, the yearly

(Continued on page 32)

JOHNSONITE
PLASTIC PIPE

- Odorless
- Tasteless
- Non-Toxic
- Corrosion-Proof
- Flexible or Rigid
- Acid Resistant
- 1½ Times Less Frictional Loss
- 13 Times Lighter Than Ordinary Pipe
- Adaptable To Standard Fittings

Complete Literature on Request

Out In The Open Or Out of Sight
The Right Plastic Pipe is Johnsonite

FOR INDUSTRIAL AND COMMERCIAL APPLICATIONS EVERYWHERE

JOHNSON
PLASTIC CORP.
BOX 268 • CHAGRIN FALLS, OHIO

the driller and the *LAW*

WELL DRILLER AS AN EXPERT WITNESS

A well contractor sued a landowner to recover the cost of drilling several artesian wells and to recover damages for the landowner's refusal to permit him to complete another well.

In order to collect, the contractor had to prove to the satisfaction of the court what was a fair price for drilling a 4-in. artesian well at the location involved in the case, and whether a certain drilling rig which he intended to use in drilling a 6-in. well, was capable of doing the job.

The contractor won his case in the trial court at Providence, R. I., and won again when the landowner appealed to the Rhode Island Supreme Court (Loughran v. Del Santo, 85 Atl. 2d. 66).

The contractor relied strongly on the testimony of one Zinn, a journeyman driller, and one of the principal points argued in the Supreme Court was whether Zinn was qualified to give expert testimony as to what was a fair price for the drilling involved and as to whether the contractor had the right sort of rig to drill a 6-in. well.

Expert Witnesses Classified

Ordinarily, witnesses are permitted to testify only to facts which they know to be true of their own knowledge, and not things which other people have told them are true. But an exception is made in the case of one who qualifies as an expert witness, such person being permitted to

give an opinion as to what a certain fact may be without knowing for sure whether it is so.

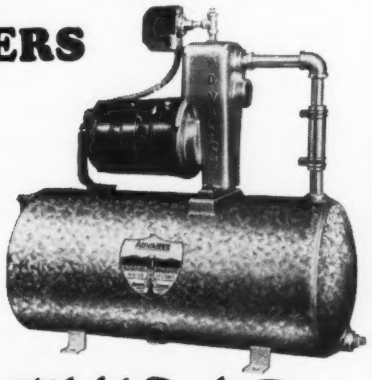
Often, as in this case, the court and the jury need expert witnesses to enable them to reach dependable decisions. Frequently, engineers, appraisers, doctors, and others are called upon to give expert opinions based on their learning and experience.

The landowner's lawyer argued that Zinn was scarcely more than a common laborer without business experience in estimating well drilling costs. But the Supreme Court decided that the trial court did not make a mistake in allowing the driller, Zinn, to testify as an expert witness. His experience consisted in manual work involved in drilling, covering 30 years. He testified that he had drilled so many artesian wells that he could not remember the number. He had also been a partner in a well-drilling firm, at one time.

The interesting and important point is that an old-time journeyman driller may qualify as an expert witness in court on matters involving drilling operations.

Arthur L. H. Street.

DRILLERS



Left: New ADVANCE HZ "All-American" shallow well water system. Up to 975 g.p.h. . . . 100% self-priming . . . fully automatic. A sales-builder de luxe.

CLIP THIS AD

YOU'LL WIN SALES . . . BUILD GOOD WILL . . . SAVE YOUR PROFITS with the expanded line of ADVANCE high-capacity automatic water systems —3 to 300 g.p.m. for deep or shallow wells. Streamlined; efficient; durable.— Just clip this ad and mail it to office nearest you for complete details, plus copy of our *new 20-page color catalog describing complete line.* Do it now!

ADVANCE PUMP COMPANY

2531 NINTH STREET
Dept. D, Berkeley 10, Calif.

321 MARKET STREET
Dept. D, Hamilton, Ohio

from the *MAILBAG*

This page is open to any of our readers having questions to ask relating to drilling, driving pipe, dressing bits, etc. All letters will be answered promptly by experienced drillers and engineers who are qualified to give intelligent advice on these subjects. We will publish as many letters of general interest as space will permit. Address: The Driller, South Milwaukee, Wis.

Drilling in Sand, Advised to Use Mud

Dear Sir:

We are drilling in sand and the pipe is always filled with sand. When we empty the pipe we just have time to start again and sand comes up. Is it better to use water or not? Is it better to put small gravel in the pipe?

G. L. **Canada**

We note you are having trouble with sand heaving up in the pipe. This frequently happens when driving pipe through sand and it is usually difficult to drill out the plug or get the tools down to the bottom of the pipe before the sand heaves. The more sand bailed out the tighter the pipe becomes bound by the sand flowing toward the hole and the more difficult driving becomes.

This condition can be avoided and the pipe driven easily if some good drilling mud is used to mud up the sand and lubricate the pipe for driving.

A good drilling mud is Gleason, produced by H. C. Spinks Clay Co., Inc., Paris, Tenn. The drilling mud is mixed with water to a light consistency, so that it will pour freely into the hole on the top of the packed sand. At the same time some of the mud, of a heavier mixture, should be packed into the water channels of the bit before running the tool. If you do this you should be able to drill out the plug, although it may take a while to get started, that is, until the drilling mud and packed sand gets mixed freely so that the tools will penetrate it and permit bailing the sludge.

It is best not to bail the hole more than absolutely necessary to allow tools to drop. Instead of bailing the hole, put in more water and fill the water courses of the bit with the drilling mud, then run the tools again without bailing and always leave as much fluid in the hole as possible.

By this procedure the hole can be drilled ahead of the casing as much as 10 or 15 feet in heaving sand or other troublesome formations.

Traveling in South Seas? You Are Invited to Stop

In a letter we received recently from one of our good readers in the Fiji Islands it was requested that an ad be run in the Bargain counter section. Since the message is unique but of a personal nature, and Bargain counter has no department for personals, we bring it to you here. That part of the letter follows:

Sirs:

Would you kindly insert the following ad in the Bargain counter. If you will let me know how much it costs I will gladly pay for it. . .

Foreman in charge of four 24-L Bucyrus-Erie drills operating at Vatukoula Fiji Isles would like to exchange mutual ideas on all phases of cable drilling with any

(Continued on page 35)

Greatest Name in Cable Tools

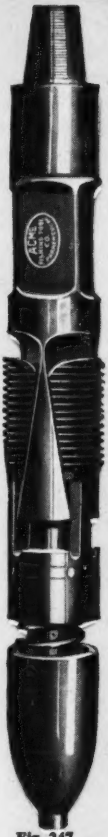
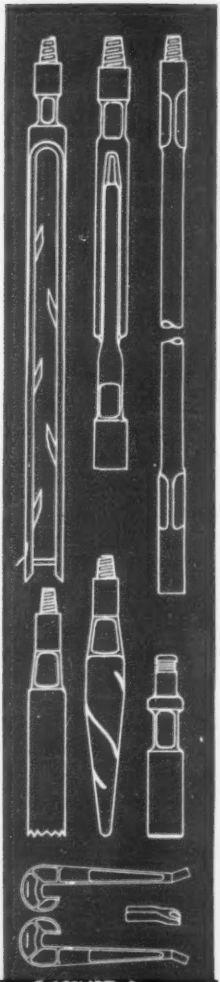


Fig. 247
Acme Trip
Casing Spear

Acme

TRUSTWORTHY SINCE 1900



Recovers Costly Pipe

. . . U-N-D-A-M-A-G-E-D !

In these hi-cost pipe times, Acme's Trip Casing Spear is a bonus value tool . . . Does its important recovery job easier, quicker and without pipe damage. Vital parts of special alloy steel. Full circle hitch prevents oblonging when jarring. Long slip seats and finger-trip ring assure non-breakable slips. Quick-setting, positive action tripping device, for various pipe weights. (3-Slip style, 6" and smaller; 4-slip, 8" and larger.)

From billet to finished Spear, every detail confirms Acme's fine tradition for: PREMIUM grade steel, to most rigid analysis specifications; CORRECT heat-treatment, to exactness of electrical automatic controls; Craftsmanship of 51-years specialized experience backlog.

Acme Casing Spears are STANDARD with 100's of top-flight Drillers everywhere. Because accumulated "know-how" of our own fishermen puts in that EXTRA inner-ruggedness so essential to longer, harder field service.

The tool featured above – one of 95 in our new Catalog — is fashioned by 51-years of superior "know-how" . . . providing more of EVERTHING needed in an Acme String.

Mail penny postal NOW for your free copy of Acme's new 32-page Catalog and Tool-use Manual — expressly compiled and packedful of "cashable" information for Water Well Drillers.

Acme Fishing Tool Co.

PARKERSBURG, W. VA.

To-be-Sure—Always Ask for Acme's.

ACME DRILLING & FISHING TOOLS Since 1900

BITS from the wit sharpener

He: "I can't see what keeps girls from freezing."

She: "You're not supposed to."

The strong man at the fair had squeezed the juice out of a lemon. Holding it up before the crowd he shouted, "I'll give $5 to anyone who can squeeze another drop of juice out of this lemon!"

Up stepped a little man. He gripped the lemon, and to the surprise of the crowd, squeezed out several drops.

"It's easy," he murmured, "I'm a tax collector."

Judge: "What possible reason does the jury give for acquitting this man?"

Foreman: "Insanity, your honor."

Judge: "All twelve of you?"

His health wasn't any too good, so the Eastern city-dweller went looking for a place to live in the Southwest. In one small town in Arizona, he approached an old timer sitting on the steps of the general store. "Say" he asked, "what's the death rate around here?"

"Same as it is back East, bub," answered the old fellow, "one to a person."

"Officer, what makes you think this gentlemen is intoxicated?"

"Well, Judge, I didn't bother him when he staggered down the street, or when he fell flat on his face, but when he put a nickel in the mailbox, looked up at the clock on the tower, and said, 'My God, I've lost 14 pounds,' I brought him in."

A salesman taking his bride south on their honeymoon visited a hotel where he boasted of the fine honey served there. Turning to the waiter he asked, "Sam, where's my honey?"

"Ah don't know, boss," answered the waiter, eyeing the woman cautiously, "she don't work here no more."

Alice: "What do you think of your new boy friend?"

Irma: "I don't know — haven't decided yet whether he's a gentleman or just shy."

A woman missed her gloves as she was leaving the restaurant where she had dined with her husband. Asking him to wait, she hurried back to look for them, searching first on the table and finally lifting the cloth to peer under it.

Just then a waiter hurried up to her.

"Pardon me, madam," he said, "but the gentleman is over there by the door."

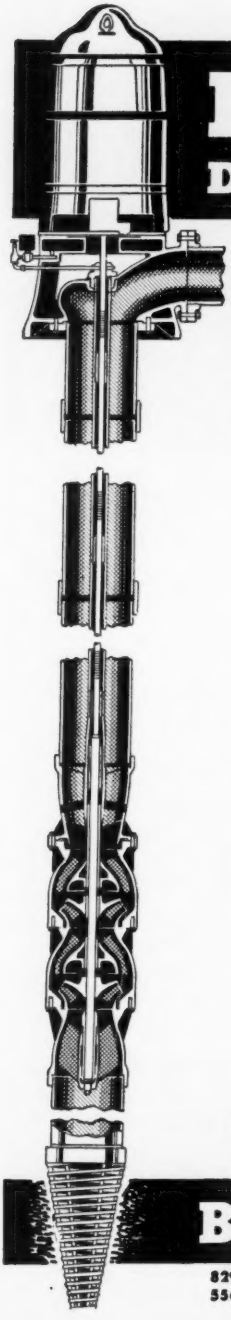
Wife: "How do you like my new evening gown?"

Husband: "All right, but why don't you crawl into it a little farther?"

Willie Johnson, a sawed-off, beaten-down little colored fellow, was arraigned in a Texas district court on a felony charge.

The clerk intoned: "The State of Texas versus Willie Johnson."

Before he could read further. Willie almost broke up the meeting by solemnly declaring, "Lawdy! What a majority!"



BERKELEY
DEEPWELL TURBINES

A SIZE FOR EVERY PUMPING CONDITION

From a small 4" dual purpose turbine to the large irrigation models with capacities in excess of 3500 G.P.M.

WATER OR OIL LUBRICATED

Water Lube construction incorporates only the highest quality time-tested rubber bearings. Sleeve couplings of a hard, corrosion resistant material insure a long wearing dependable job.

OIL LUBRICATED ASSEMBLIES

combine extra heavy inner column, all bronze bearings, and accurately machined steel shafting into a unit unsurpassed in performance and wearing qualities.

SEMI-OPEN OR ENCLOSED IMPELLERS

Enclosed impellers of bronze or porcelainized cast iron, hand filed internally and carefully balanced. All bronze semi-open impellers available in the more popular sizes.

Illustrated at the left is a Model 1403HH, capable of capacities in excess of 2500 G.P.M.

BERKELEY PUMP COMPANY

829 BANCROFT WAY, BERKELEY 2, CALIFORNIA DEPT. R
556 TIFT AVENUE, S. W., ATLANTA, GEORGIA DEPT. R

Newly elected officers of the Missouri Water Well Drillers' Assoc. posed next to the state geological building, they are, left to right: B. G. Heinlein and W. B. Russell, Directors; John Groskopf, Geologist; Roy Wallace, Vice Pres.; Paul Clark, Pres.; Dale Fuller, Service Secretary; and Frank Weldon, Treasurer. C. S. Wise, Secretary, was not present when the photo was taken.

News . . .

(Continued from page 25)

increase in the total wells built which, as previously stated, has been 2,604. Abandoned ground water system wells total 345. Wells retired from service are 1,066, while standby service wells are 200. Since 1914, wells in active service have varied but have not exceeded nor fallen below 1,000 by more than approximately 100. Fewer wells are in service now than thirty-five years ago.

The authors report that the average rate of pumping per well expressed in gallons per minute on a twenty-four hour per day basis has risen from thirty-eight gpm in 1900 to ninety-four gpm in 1948.

The principal water-bearing formations used are summarized in tabular form, indicating few drift wells deeper than 300 feet.

An interesting diagram shown was the trends in types of wells constructed in the unconsolidated materials from 1880 to 1943. These diagrams showed that both dug wells and wells having a metallic casing without any screen, had practically disappeared. Screen wells without any gravel pack, had periods both of increase and decrease but are now about at the previous peak which occurred in 1915. Wells using porous concrete screen were started in 1920, and those using a gravel pack screen started in 1915. These two types have each year generally increased in numbers. The authors also showed by diagram the rate of construction of wells in various bedrock formations in Illinois.

25-yr. Average Well Life

A study was made of the service life of wells, which was defined as "the period of time between the date when it was placed in service new, as part of the supply system and the date when it was retired from service."

"Median service life was taken as

Why Make Hole The Hard Way?

BUCYRUS ERIE

In hard formations like trap rock and quartzite or soft formations like lime or clay . . . no matter how tough or how easy the going might be, you'll find you can put down a well faster, more economically with a Bucyrus-Erie drill bit on your tool string.

Why? Because Bucyrus-Erie bits are built for efficient service on the basis of practical experience in all types of formations and in all parts of the world. Their field-proved design provides for a controlled accurate shape that includes:

1. A sharp, penetrating cutting edge that takes a real bite on each impact of the tools.
2. Large-area crushing faces for pulverizing the chips.
3. Long-reaming edges for cutting the hole round and smooth.
4. Deep, wide water-courses that allow more room for the cuttings and therefore require less frequent operation of the bailer.

Why not try a Bucyrus-Erie bit on your next drilling job? Write today for complete information on our complete line.

20A51C

BUCYRUS-ERIE COMPANY • South Milwaukee, Wisconsin

the time in years such that half of the wells in the group being considered had longer lives and half had shorter lives at retirement."

It was found that the median service life in years in the unconsolidated material was twenty-five, while for sandstone wells it was forty-seven and over sixty years for limestone. The experience with gravel pack wells was said to have been too brief to establish definite longevity as less than one-third of those built have been retired. However, the mortality survival curves of gravel-packed wells and of tubular screened wells were found to be approximately similar.

A table of reasons for the abandonment and retirement of wells, showed 345 abandoned and 1,066 retired, representing 54.2% of all wells constructed.

The four main groups of reasons given for the wells being abandoned or retired, in the order of the number of wells eliminated, were as follows: Inadequate supply, declining capacity, recession, depletion or influence of other wells, 680; sand filling, clogged screens or blocked formation, 372; objectionable quality and contamination, 158; corrosion disintegration, defects of screen or casings, 126.

An interesting diagram showed the methods used for taking water from wells in Illinois from 1880 to 1948. Single or double-acting plunger pumps led up to 1925, followed by air-lift, suction lift with free flow at the bottom. The vertical shaft turbine pumps increased very rapidly after their introduction about 1908 and had passed all other methods by 1925. By 1940, practically all the earlier methods had been discontinued with the vertical-shaft turbine far in advance, although jet pumps rapidly came into use after starting in 1940.

The authors note in closing that the vertical turbine pump has been a major factor in enabling the increased rates of pumpage from wells. Also that attempts are being made to forestall the early retirement of wells through the installation of larger number of wells to be pumped at moderate rates.

In Williamsburg, Ontario, Canada a tourist court well goes down through rock with the Bucyrus-Erie 20-W owned by R. H. Casselman.

Safe Yield — Mortality Discussed

Mortality experience with wells was discussed by William A. McEllhiney, President, J. P. Miller Artesian Well Co., Brookfield, Ill., who praised the work done in Illinois by the State Water Survey and State Geological Survey. This paper was on rock wells and called attention to the necessity of avoiding the interflow between water-bearing rock formations. It urged planning, constructing and maintaining wells that would give longer life of trouble-free performance and concluded that

many of the old wells have had to be abandoned due to misuse and abuse.

H. E. Lauman, President, C. W. Lauman Co., NYC, said screen wells in the unconsolidated formations had been constructed for the past thirty years on Long Island, N. Y., with the abandonment of some of them caused by changing conditions, due mainly to the water level in western Long Island dropping and changes in the method of obtaining supplies from wells.

The subject of "Safe Yield of Ground Water Sources" was introduced by Malcolm Pirnie, Partner, Malcolm Pirnie Engineers, NYC, who noted that a large amount of data on groundwater resources of Florida had been obtained during the last twenty-five years.

"Some Geologic and Hydrologic Factors That Affect the Perennial Yield of Aquifers" were described in a lengthy paper by V. T. Stringfield, Geologist, U. S. Geological Survey, Washington, D. C. As the author was unable to be present, the paper was presented by Hilton H. Cooper, Jr., District Engineer, U. S. Geological Survey, Tallahassee, Fla. and safe yield of ground water sources as affected by well construction and operation was outlined by Paul Schweitzer, President, Layne-Atlantic Co., Norfolk, Va.

Reprinted From *Water Works Engineering*

Mailbag . . .

(Continued from page 28)

retired or actively interested cable tool driller who may be passing through Fiji, (a stop over port for all overseas planes to New Zealand and Australia). A stop-over could be made at the local airport, Nandi, and gentleman could be the guest of the drilling foreman during his stay in the colony.

For further particulars air mail letter to:
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Tax Claims . . .

(Continued from page 17)

of distinction which may not be visible to the layman. It is not wise for a taxpayer to assume the government will not consider him an evader, regardless of his intentions.

Tax evasion may result in criminal action. This, of course, will result not only in the collection of the delinquent taxes but interest and, probably, a monetary penalty as well. In addition, it may result in a jail sentence, depending upon the evidence.

When a taxpayer's property is already mortgaged to its fullest extent, the government may be disposed to worry along with him. Government policy is to try to collect tax indebtedness by other means than legal action whenever possible. However, this is qualified by whether a taxpayer shows any disposition to settle the debt.

Since the breaking of the tax scandals in the Bureau of Internal Revenue, responsible employees are showing a noticeable reluctance to be lenient, lest this be misconstrued as a "fix," even though it may not be. As a result, more and more liens may be expected in the future, some of which may reflect unusual zeal on the part of Bureau employees.

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Florida Division—Drawer DR-1

Lakeland, Florida

Fresh Water Dike . . .

(Continued from page 13)

sibility of Hyperion sewage effluent for the work at Manhattan Beach.

All of these possible solutions have been explored and tabled, with the exception of the fresh-water-ridge method and artificial subsurface barriers. The situation all along the West Coastal Plain of Los Angeles County continued to get worse during the planning period, and the rapid encroachment of salt water underground showed all too plainly in well tests conducted by the Flood Control District. One point was easy to agree upon: the West Coastal Plain was suffering from salt water intrusion worse than any other area except possibly the Orange County Plain, and here was a logical place to start the experiments. What can be learned from these experiments may well decide the future of many acres of California land, as well as the future of municipal water supply.

Part II of this series will describe the details of the Manhattan Beach experimental work, will list the hydraulic questions which engineers hope to answer, and will feature a trip afield to where one of the most interesting and significant water projects in the United States is currently under way.

BARGAIN counter

All advertising in this section is payable in advance. Enclose your check or money order with copy. Rate: 60c per line. Minimum charge $2.40. No discounts; no commissions. Count your own copy to avoid delay. The average line contains 28 characters (20 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number if blind advertisement is desired. Closing date — 10th of preceding month. Example — January issue closes December 10th. Be sure to address separate inquiries to each advertiser by using the correct box numbers. Mail Box inquiries care of THE DRILLER, South Milwaukee, Wis.

DRILLS FOR SALE

Rebuilt well machine, Model A engine driven. Machine mounted on 1½-ton '36 Ford with duals. Running condition. Machine can drill 1000 ft. deep. Mrs. Myrtle Tayer, Milnor, N. D.

Loomis drilling machine. Mounted on Diamond T truck. New lines and complete set of 4" tools. In good condition. Priced at $750. Also an all steel pipe trailer with new tires. Mrs. George Murphy, Pennville, Indiana.

Two all steel well drill rigs, mounted on truck. Two 10 foot long 10" well screens No. 60 gauge. Also pipe for sale. Write Clarence Chadwick, Box 14, Deford, Michigan.

Howell 60, all steel, shock absorber, pneumatic tires, new motor. Located Iowa. Box 467

Keystone #50 water well drill for sale. With calf reel, bull reel, mounted on International 10-wheel truck. A-1 condition. Immediate delivery. Price on request. Box 458

Truck mounted rotaries, Failing and Sullivan, complete with tools, drill rod, etc. Fred E. Butler, Box 1832, Casper, Wyo.

DRILLS FOR SALE

Bucyrus-Erie 36-L for sale, new 1950, Cummins diesel motor, trailer mounted with vacuum brakes, casing strut, spooling device, tension clamp, pulley extension, tool crane. Rig is completely equipped with all tools and casing equipment for 8", 6" and 5" holes, including steel doghouse and fuel house trailer mounted, Kohler light plant, 8" drive tools. New 3500 ft. drill line, and sand line. Rig has never drilled below 1800 ft. and is like new. Box 470

Rebuilt Cyclone rig, truck mounted on 1937 International. All steel with 35 ft. telescopic derrick. Shock absorber under crown sheave. Complete with 5¾ tools. Will sell for $1150 or will accept car in trade. Phone Mentor, Ohio, 7-7441.

Two Keystone No. 50 well drills with calf reel, 6-cylinder engines, electric starter. Mounted on good heavy trucks. A-1 condition. Write or phone 1005-W. Adams-Massey Company, Carrollton, Georgia.

Drilling rig custom built by mechanical engineer. Compares with 21-W. Mounted on 2-ton Reo truck. All in A-1 shape. Ideal for one man operation. Tools for 6" and 8" hole. Price $1950. Have too many machines. Remick Artesian Well & Pump Co. Inc., Rye, N. H.

Used Cyclone drilling machine, heavy duty.

Used Chapman drilling machine.

Two used Bucyrus-Erie Model 21-W drilling machines with or without tools.

Tillsonburg Pipe and Supply Co., Limited, Box 65, Tillsonburg, Ontario, Canada, Phone 437.

35-W Armstrong all steel drill mounted on '33 2-ton Reo. Two strings of tools, one each 4-5-6-7 inch bits, tool wrenches, bailers, water tank, two new ten-ton hydraulic jacks and many other tools too numerous to mention. A 1944 flat bed Ford truck with new motor. Equipment in excellent condition. Complete $2500. Lawrence Amundson, Lake Wilson, Minn. Phone 70.

DRILLS FOR SALE

Five Bucyrus-Erie 29-T drills, 440 v., 3 phase, 60 cycle, electric power, complete with tools and a stock of spare parts. Also one Bucyrus-Erie No. 12 bit dresser. Location, Middle West. Box 471

Truck mounted, cable tool drilling machine. Will drill 3", 4", 5" and 6" holes, 500 feet deep. Complete with tools, wrenches, jars, drive blocks, etc. Everything complete at only $1795. A quantity of galvanized pipe wholesale with machine if desired. Owner has other business interest. Harold Dayringer, 4140 Wheeler Road, Midland, Mich. Phone 3737.

Bucyrus-Erie 24-L used very little; like new. Semi-trailer mounted on dual pneumatic tires, power derrick hoist, guy lines, etc.

Federal two-ton truck tractor in excellent condition, driven less than 23,000 miles.

22' flat bottom semi-trailer with nearly new dual tires. Price of these three units $6500. Would consider selling each unit separately. D. E. Edwards, West Branch, Iowa.

All-steel double beam jetting machine with 32' telescoping derrick. Mounted on 4-wheel trailer with 6.50x16 pneumatic tires. Trailer has low speed self-propelling attachment for maneuvering on location. Power derrick hoist and cathead. Powered with 7½ H.P. Fairbanks Morse diesel engine. Complete with 2" jetting tools, drill rods, maul and 3x12 duplex pump. Located in Indiana. Price $1750 complete. Box 469

Well equipment. Good used spudders, rotaries, tools. We sell them. We buy them. Contact us if you want to buy or sell. We rent fishing tools. Everything for well drilling. Write or phone. Pressey & Son, Pueblo, Colo.

Crawler type Loomis Models 44 and diesel driven 88. Priced for quick sale. Phone 4849-R or write P.O. Box 552, Pottsville, Pa.

(Continued on page 38)

DRILLS FOR SALE

(Continued from page 37)

Bucyrus-Erie 21-W drill with 500' drill line, 500' sand line, and all necessary tools. Machine mounted on 1935 Diamond T two-ton truck. Contact Ralph L. Phillips, White Lake, New York.

#240 Star, 4 years old, mounted on a 1934 Ford 1½-ton, long-wheel base truck. Equipped with cathead, pipe braces and engine throw-out clutch. Will sell with or without 4" tool string, 600' of ⅝" drilling line and 300' of ⅞" sand line. In A-1 condition. Located in Indiana. Box 468

Home-made machine with 35' all steel derrick with Bucyrus-Erie shock absorber and power derrick hoist. 700' capacity machine powered with Waukesha XA-226X engine. Located in Indiana. Price $1500. J. B. Ortman & Sons, Route #1, Kokomo, Indiana. Phone 23427.

#30 Sparta wood frame band wheel type machine, steel 38' one-piece derrick. Mounted on 2½-ton 1934 Dodge truck. Complete with 350 feet ⅝" drilling cable and 350 feet ¾" sand line. Bargain with or without tools. For sale by Ray Van Hercke, Little Falls, Minn.

1949 Model 21-W Bucyrus-Erie drill in good condition. This machine is mounted on a 1937 International two-speed axle truck. Equipment includes new ⅝" drill line, 6" & 8" tools, 2¼"x3¼"-7 API joints. Price $3150. Machine is now working near Okarche, Oklahoma. Clarence Schroeder, Okarche, Oklahoma. Phone 29-F-2.

#42 Cyclone, for truck mounting, excellent condition. Boring machine for tile wells. Tools from 2" to 14" including bits, stems, jars, etc. Also 6" test pump with belt drive up to 100 G.P.M. International 1948, 1½ ton, with Army box and tool boxes on sides. With winch and "A" frame. Chas. Shetler, 2442 Benjamin St., Saginaw, Michigan.

MISC. FOR SALE

4½" or 5"x16' stem, 2x3-8 joints, bits 4" to 7". F. D. Shoemaker, Box 107, Timpas, Colorado.

2 Johnson brass well screen, 8 slot lead top, size 6"x10'. 7½ HP 3 Ph. 1800 RPM U. S. Motor, newly rebuilt. John H. Payton, 790 E. College St., Jackson, Tenn. Phone 7-6158.

Tandem axel pipe trailer, complete with flat bed and stakes. This trailer is made to pull behind a pickup. It has four good tires 7:50x16. It is an ideal trailer for hauling pipe and drill tools, etc. Hoeg & Ames, Lincoln, Iowa.

NEWLY DESIGNED Water Level Indicators for accurate determination of pumping and static Water Levels are now available from FISHER RESEARCH LABORATORY, INC., of Palo Alto, California. The new MASTER Water Level Indicator features a special low cost electrode, two conductor cable, metal tag cable calibration, a handy reel type spool, and a low cost easily replaceable battery. The use of two conductor cable makes casing or other outside connections unnecessary so that the unit functions equally well in uncased test holes or uncased hard rock wells.

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Complete set of 6" drill tools, and wrenches with 3½ square on tools. 350 ft. ¾" drill cable like new. Box 472

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Wanted: We buy good used well drilling equipment, spudders, rotaries, core drills, tools. Everything for well drilling and well service. Pressey & Son, Pueblo, Colo.

HELP WANTED

Man well experienced in all phases of cable tool drilling. Good pay, transportation to and from work furnished. In answering, please give full qualifications, especially what you know about steel and give telephone number. See, call or write John H. Harkleroad, Leesburg, Va.

POSITIONS WANTED

Experienced driller seeking a regular job. M. T. Hales, 324 Tucker Street, North Chattanooga, Tenn.

Competent driller wants steady work with a dependable company or contractor. Long experience on drilling and can set and pull screens. Can give references. Write: 36 East Main Street, Middleboro, Mass.

PROFIT SHARING HOOKUP, WANTED

Established my own pump and drilling business in Northern Indiana in the Spring of 1922. Have a light cable tool rig truck mounted, rigged for jetting 2" and 3" wells at present, also have small shop tools and office equipment, enough to carry on a two or three man business. Have done both rock and drift drilling and can handle anything in the domestic pump line. Am 54 years of age, would like to make a profit sharing,or partnership hookup with a driller, located in 2" to 4" territory, preferably in a small town.
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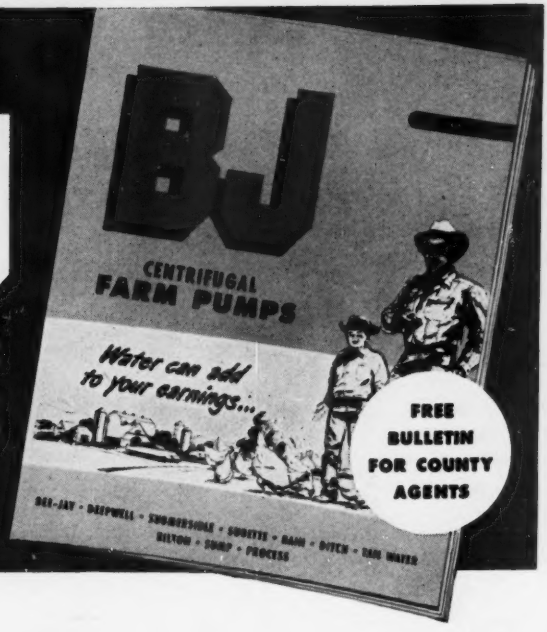

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